

Renewable Energy and Carbon Footprints

The Facts

The pulp, paper and print industry is one of the leading sectors when it comes to renewable energy and mitigating carbon impact. The industry is relatively energy-intensive, but it also has a proven commitment to energy efficiency and is Europe's biggest industrial user of renewable energy. This explains why the sector is responsible for comparatively low greenhouse gas emissions, at 0.9% of the European total in 2021.[1]

The industry is committed to using clear and credible carbon footprint calculations so that stakeholders can trust the information they receive.

The pulp and paper industry is a substantial user of energy but has a proven commitment to efficiency, including the widespread investment in Combined Heat and Power (CHP) systems.

The print and paper industry is one of the lowest industrial greenhouse gas emitters in Europe, accounting for just 0.9% of emissions in 2021. This is low compared to non-metallic mineral products industries (3.2%) and basic metal industries (2.9%).[1]

Primary energy is used in pulp and paper making for producing heat and steam (used for processing and drying fibre) and for generating electricity to run machinery. Additional electricity is purchased from the grid. Other energy uses include facilities and transport.

Between 2010 and 2021, the European paper industry reduced its total primary energy consumption by 8.7% and is lower than it was at the beginning of this century. The European paper industry produces 54.6% of its electricity onsite, of which more than 95% is generated through highly efficient CHP (Combined Heat and Power) plants.[2]

CHP integrates the production of usable heat and power (electricity), in one single, highly efficient process. It generates electricity while capturing usable heat that is produced in the process. This contrasts with conventional ways of generating electricity where vast amounts of heat are simply wasted.

By using waste heat, CHP plants can reduce carbon emissions by up to 30% compared to the separate means of conventional generation via a boiler and power station.[3]

The specific technologies employed, and the efficiencies they achieve will vary, but in every situation CHP offers the capability to make more efficient and effective use of valuable primary energy resources.

The pulp, paper and print sector is the biggest industrial user of renewable bioenergy in Europe.

The European pulp and paper industry produces original bio-based products using wood, a renewable material. It is also the largest single industrial user and producer of renewable energy in the EU. The industry's primary on-site energy source (not including bought-in electricity) is biomass at 61%, followed by gas at 33%. The remaining 6% includes coal and other fossil fuels.[2]

Biomass is biological material derived from living, or recently living organisms. For the pulp and paper industry, this is typically wood by-products, such as wood residue, bark, and 'black liquor' (a derivative from the pulping process).

> *"The industry has consistently increased its use of biomass since 1991, rising by 57% to 728,471 tonnes in 2021."*
>
> Cepi, Key Statistics, 2022

Correctly managed, biomass is a sustainable fuel that can deliver a significant reduction in net carbon emissions when compared with fossil fuels.[4]

The pulp, paper and print sector has comparatively low greenhouse gas emissions.

As the paper industry's use of renewable bioenergy releases only 'biogenic' carbon, equivalent to that recently absorbed from the atmosphere by the growing biomass, this proportion of its emissions is effectively carbon neutral. To ensure

that forests reach their full potential as a climate change solution, they must be managed sustainably. Sustainable management helps to increase the amount of carbon dioxide that forests remove from the atmosphere and improves their ability to store it as carbon in their biomass.[5]

This explains why the print and paper industry only account for 0.9% of European greenhouse gas emissions, compared to the non-metallic mineral products industries at 3.2% and basic metals industries at 2.9%.[6]

The paper industry's key raw material, wood fibre, also absorbs carbon dioxide from the atmosphere as it grows, and this is locked-up for the duration of the fibre's life cycle.

Trees and other vegetation absorb carbon dioxide from the atmosphere as they grow and a proportion of it is locked up in the wood fibre. Most forest carbon is found in the living biomass (44%) and soil organic matter (45%), with the remainder in dead wood and litter. With appropriate replanting and responsible forest management, long-term carbon stocks are maintained. Therefore, the forest acts as a carbon sink, withholding carbon from the atmosphere and so helping to mitigate the effects of climate change.[7]

EU forests, for example, absorb the equivalent of nearly 8% of total EU greenhouse gas emissions each year.[8] Global forest carbon stocks are estimated to be 861 billion tonnes or 27 times the world's annual carbon emissions from fossil fuels.[7] Carbon remains locked up within wood products for the duration of their life cycle.

Paper products typically have a relatively short life span (with a few exceptions such as books or archived documents). The climate change benefit of wood fibre is extended through recycling, as it continues to store sequestered carbon.

In the long term, forests play an important role in both mitigation (for example, through carbon sequestration) and adaptation (through increasing resilience to climate change). They provide mitigation through forest management schemes such as conservation and adaptation through sustainable forestry. A sustainable forest management strategy can maintain or increase forest carbon stocks while producing an annual sustained yield of timber, fibre or energy from the forest.

The industry is committed to a clear and credible carbon footprint methodology for its products.

A product's 'carbon footprint' is generally understood to be the result of a calculation showing the net greenhouse gas emissions associated with its life cycle. The information may have a variety of uses and can be calculated using differing methodologies or scopes. Therefore, any carbon footprint analysis should be transparent, understandable and credible.

The paper industry has worked to develop a framework, which has been tried and tested for over a decade, that guides the calculation of carbon emissions (and removals) within 'ten toes' of a carbon footprint, from forestry and other raw materials, through production, and on to transport, use and end-of-life disposal.[9] This common approach allows companies to communicate their product's carbon footprint in a consistent fashion so that stakeholders can have trust in the information they receive.

Sources

1. European Environmental Agency, EEA Greenhouse Gases – Data Viewer, 2023. Total pulp, paper and print CO_2 emissions for the EU-27 in 2021 was 23,096,235 tonnes. Total CO_2 emissions for all sectors in the EU-27 in 2021 was 2,546,204,939.
2. Cepi, Key Statistics, 2022
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4. Forest Research, Tools and Resources, General Biomass Information, accessed September 2023
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8. Forest Information System for Europe, Forest and Climate, accessed September 2023
9. Cepi, Framework for Carbon Footprints for Paper and Board Products, 2017

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